WATER THAT IS SAFE TO DRINK: ASSURE COMPLIANCE WITH DRINKING WATER STANDARDS

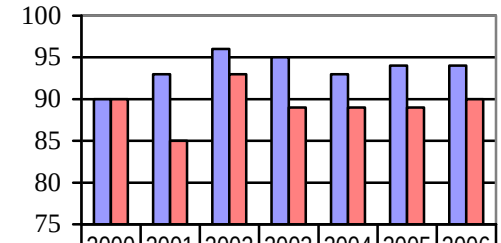
INDICATOR: PERCENTAGE COMPLIANCE WITH HEALTH-BASED STANDARDS (MCL AND TT) FOR SYSTEMS AND POPULATION SERVED

WHY IS THIS IMPORTANT?

The central goal of the Drinking Water Program is assuring that the water delivered to customers meets all health-based standards (defined as Maximum Contaminant Levels (MCLs) and Treatment Techniques (TTs). This indicator tells us whether we are achieving this central goal. The indicator looks at both the percentage of systems meeting all health based standards and the percentage of the population getting its water from systems meeting all health based standards.

HEALTH STANDARDS MET AT MOST DRINKING WATER SYSTEMS

Percent systems/population in full compliance with health based standards



	2000	2001	2002	2003	2004	2005	2006
% systems	90	93	96	95	93	94	94
% population	90	85	93	89	89	89	90

HOW ARE WE DOING?

In state fiscal year 2006, 94% of all public water systems (1,623 of 1,726 PWSs) met all federal and state health-based standards. The performance and trends in this indicator are excellent.

The data for compliance as measured by percentage of total population served evidence the same trends. The community systems using surface water serve the largest populations and as they came into compliance with the Surface Water Treatment Rule and Lead and Copper Rule, overall compliance rates improved dramatically, as this data shows. The challenge in the coming years will be to maintain and even improve this performance as new standards are put in place.

WATER THAT IS SAFE TO DRINK: IDENTIFY AND PROTECT FUTURE SOURCES OF DRINKING WATER

WHY IS THIS IMPORTANT?

INDICATOR UNDER DEVELOPMENT

LAND USE DEVELOPMENT CHOICES AFFECT FUTURE DEVELOPMENT OF DRINKING WATER SOURCES

As the source water assessments MassDEP has conducted demonstrate, some residential and commercial development choices are inconsistent with strong protection of surface and groundwater supplies of water. This development creates potential for contamination of water, and can also reduce the volume of water that can safely be withdrawn for human use. We have also seen that cleaning up contamination after the fact is very expensive and sometimes nearly impossible. Preventing harm is easier and cheaper, but requires planning ahead. It is important that as we are consuming land at an increasing rate that we know where potential sources of drinking water are located, and that we take action now to protect those areas, so that clean drinking water can be available for ourselves and future generations.

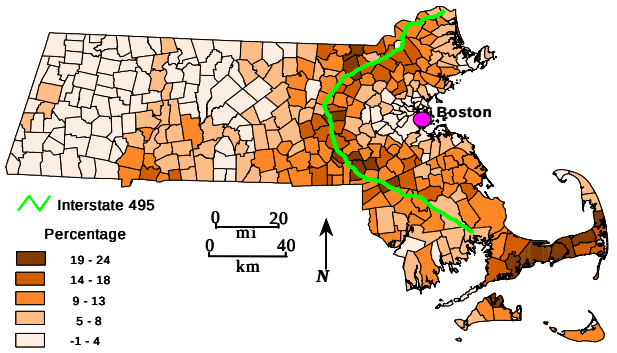


Figure 5. Map showing the percentage of land area, by town, converted from undeveloped land (crops, pastures, forests, open space) to developed land (residential, commercial, industrial land uses, etc.) from 1971 to 1999 (from MassGIS).

MAP FROM A PRESENTATION BY STEPHEN MABEE, MA STATE GEOLOGIST. USED WITH PERMISSION

HOW ARE WE DOING?

Massachusetts is consuming land at a fast pace – more than 40 acres per day according to one estimate. Unless this development is carefully planned, it could make potential sources of drinking water unavailable in the future, through incompatible land uses or release of contaminants. Massachusetts is now in the process of identifying potential sources of drinking water, so that development decisions can at least be made with knowledge of the risks and costs those choices will create. We are still in the beginning stages of this investigation, so do not yet have a measure of our success in protecting future sources of drinking water.

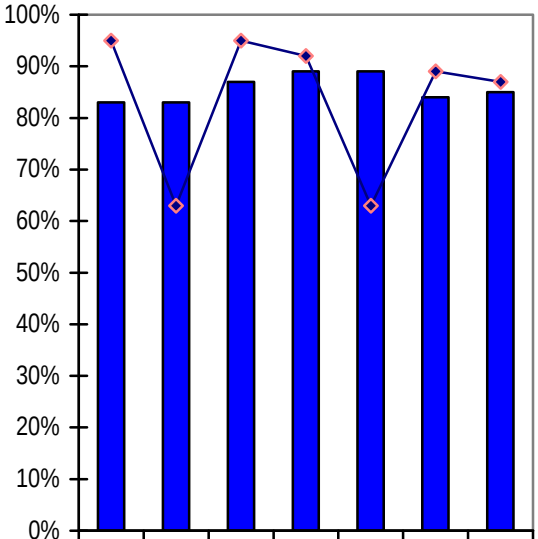
WATER THAT IS SAFE TO DRINK: KNOW IF DELIVERED WATER IS MEETING STANDARDS

INDICATOR: NUMBER OF PWS/POPULATION WITH NO VIOLATIONS OF MONITORING OR REPORTING REQUIREMENTS FOR HEALTH BASED STANDARDS

WHY IS THIS IMPORTANT?

After protective standards are set, we need to make sure systems are testing their water and are reporting the results, so we can determine if the systems are complying with the standards. This indicator measures our public water suppliers' compliance with the monitoring and reporting rules. Without testing and reporting we don't know if the water is safe to drink, so this indicator measures performance that is critical to our ability to protect public health. This information also serves a secondary function of alerting us to compliance problems before they result in standard violations, allowing us to take action to prevent contamination before it occurs.

WE HAVE GOOD DATA ON QUALITY OF DELIVERED DRINKING WATER



	2000	2001	2002	2003	2004	2005	2006
% of COM systems in full compliance	83%	83%	87%	89%	89%	84%	85%
% of pop served by systems in full compliance	95%	63%	95%	92%	63%	89%	87%

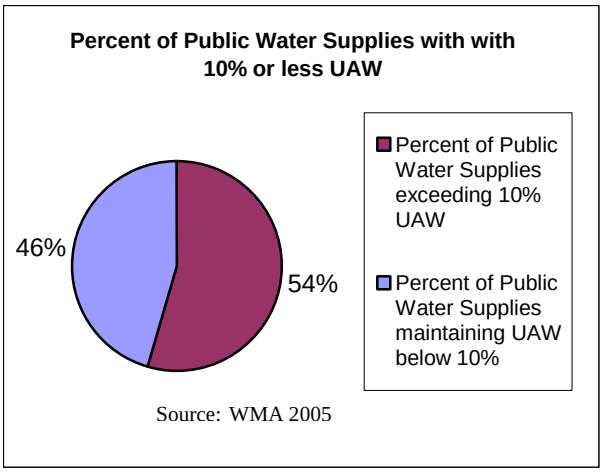
HOW ARE WE DOING?

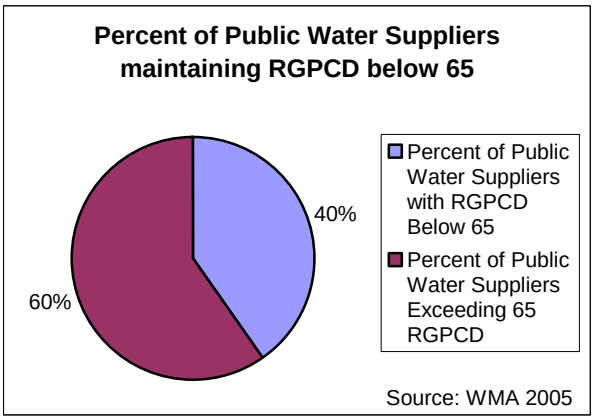
The percentage of systems that are fully complying with all of their monitoring and reporting obligations is trending upwards as smaller systems better understand the new Stage 1 DBPR and the arsenic MCL. Performance reflected in the percentage of the population receiving water from systems that are in full compliance with reporting and monitoring requirements is more uneven. This difference reflects the fact that some water suppliers serve a large number of people, so even one violation at a large system can have a dramatic effect on the indicator when stated as a percentage of people served, rather than as a percentage of systems. In fact, the drop in the percent of population measured in 2001 and 2004 resulted from reporting violations at only two systems in each year. Both measurements are important, because we want to protect all of the people, but also want to improve performance of all the systems, including the ones serving a small number of people.

SUFFICIENT WATER FOR HEALTHY ECOSYSTEMS: Promote Wise Use of Water

INDICATOR:

- Percent of public water supplies meeting unaccounted for water standards (UAW)
- Percent of public water supplies meeting residential gallons per capita per day (RGPCD) water use standards





WHY IS THIS IMPORTANT?

These indicators will measure the success of public water systems in conserving water. If we use water wisely and minimize waste, we can meet the needs for drinking water and reduce the strain those uses put on our fresh water ecosystems.

Unaccounted For Water (UAW) includes the difference between water pumped or purchased and water that is metered or confidently estimated. Unaccounted for water includes water lost through water main joints and service connections, overflow of

storage tanks, hydrant openings, leaks and other miscellaneous unmetered connections. To reduce unaccounted for water to less than 10%, the public water supplier (PWS) must make improvements to the water supply system that will reduce the volume of water withdrawn from the source(s) and minimize the environmental impact on the watershed.

For many public water suppliers, the majority of water used is to provide drinking water to residential users. By determining the number of residential users along with the volume of water pumped through residential meters within a specified time period (typically one year), a calculation can be made of the average daily volume of water utilized by residential users. The calculation for residential gallons per capita day (RGPCD) allows the PWS to evaluate efficiencies in consumer use. For those PWS that propose or have existing WMA permits, and who have withdrawals points located in watersheds determined to be High or Medium Stress, the current residential water use standard is sixty-five (65) RGPCD

HOW ARE WE DOING?

While MassDEP made a number of changes to the 2005 Annual Statistical Report to improve and standardize the data reported by water suppliers we still have significant concerns about the reliability of this data in our efforts to evaluate their compliance with the performance standards for unaccounted for water and residential gallons per capita per day. Some suppliers do not have the technology in place to accurately calculate these values; others lack the capability of tracking this information. Among suppliers who do report, the methods for calculation vary greatly, making it hard to rely on or compare reported values. In calendar year 2004, we started to implement new reporting standards that will allow us to track this information, and in the fall of 2006 a workgroup will review and revise the Annual Statistical Report as necessary to improve reporting. As an interim measure, we tracked the number of WMA permits that contain requirements for RGPCD and UAW. We are now revising permits to include the appropriate performance standards based on the degree of stress in the corresponding river basin. [See control water use - permitting] To date 20% of all permits have been revised to include these standards.

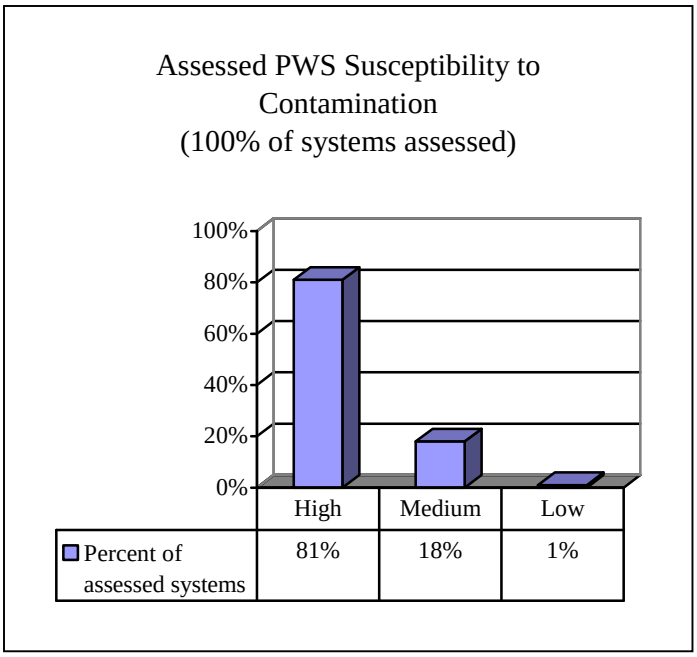
WATER THAT IS SAFE TO DRINK: PROTECT EXISTING SOURCES OF DRINKING WATER

Indicator: Number of systems with high susceptibility to contamination

MOST PUBLIC SYSTEMS HAVE A HIGH DEGREE OF SUSCEPTIBILITY TO CONTAMINATION

WHY IS THIS IMPORTANT?

One of the best ways to ensure that the water people drink is safe is to protect the source of the drinking water from contaminants. This indicator measures systems where we have assessed susceptibility of the source to contamination. This measure is preventive in nature and seeks to reduce the threat of contamination.



HOW ARE WE DOING?

The first step in reducing contamination of source waters is to locate potential areas of susceptibility. MassDEP has completed Source Water Assessment and Protection Program (SWAP) mapping and reports for all public water systems. The reports were provided to each public water system and are posted on MassDEP's web site at: http://www.mass.gov/dep/water/drinking/swapreps.htm.

The three most frequent high-ranked threats to groundwater are underground storage tanks, auto repair shops and pesticide storage or use. The three most frequent high-ranked threats to surface water sources are transportation corridors, storm water and aquatic wildlife such as beaver.

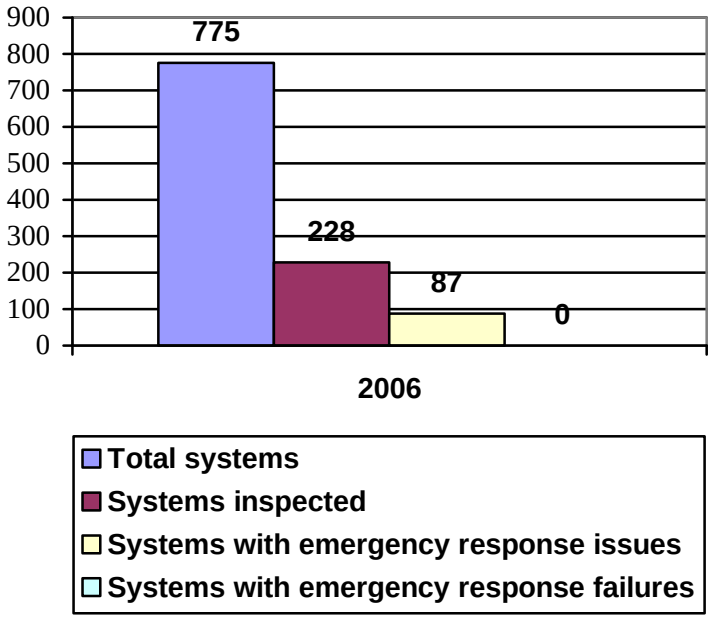
Staff will continue to work with public water systems to reduce the risk of contamination by recommending the removal of potential threats, the development of local surface water and wellhead protection plans and the implementation of proactive source protection measures. MassDEP is also working with other state agencies to prioritize their work within water supply protection areas.

SUFFICIENT WATER FOR PUBLIC HEALTH AND SAFETY: ASSURE CAPACITY TO RESPOND TO EMERGENCIES

INDICATOR: NUMBER OF COMMUNITY AND NON-TRANSIENT NON-COMMUNITY SYSTEMS WITHOUT ADEQUATE CAPACITY TO RESPOND TO EMERGENCIES

WHY IS THIS IMPORTANT?

SOME SYSTEMS COULD BE BETTER PREPARED FOR EMERGENCIES



At some time, every public water system (PWS) experiences temporary situations that impair its ability to deliver either an adequate quantity of water, or water of a desired quality to a portion of its service area. Certain events can be anticipated and response systems implemented. Because public water supplies are important in protecting public health (clean water to drink) and safety (water for fire fighting), we require all PWS to have back up systems, emergency response plans and to meet other requirements to assure that they are prepared. A good emergency response plan is at the heart of a quick and adequate remedy on a temporary basis until the usual service is restored. Certain physical provisions should also be in place in every system to enable uninterrupted availability of safe water. These provisions may involve backup energy supplies, reserve sources of water, and a distribution system designed to bypass events such as a break in a water main. This indicator measures system preparedness for emergencies.

HOW ARE WE DOING?

Most systems inspected were prepared to respond to emergencies. 228 (29%) of all Community and NTNC systems were inspected in SFY 2006. Of the systems inspected, 62% (141) were fully prepared to respond effectively to emergencies while 38% (87) had some preparedness issues. These were primarily in the areas of emergency response plan deficiencies (such as inadequate plan, outdated plan, or no plan) and inadequate storage (not enough storage for emergencies that require large volumes of water, such as main breaks and fire fighting, or in potential water quality problems such as open storage). Despite these capacity issues (which could mean that a system is not well prepared to respond to an emergency) the systems responded satisfactorily in all of the actual emergencies that arose.

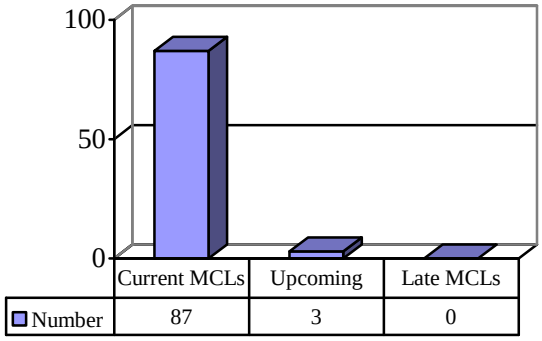
WATER THAT IS SAFE TO DRINK: SET STANDARDS FOR SAFE DRINKING WATER AT PUBLIC WATER SUPPLIES (PWS)

INDICATOR: ARE WE CURRENT WITH ALL STANDARDS AND RULES?

WHY IS THIS IMPORTANT?

Drinking water standards that reflect current knowledge about threats to public health are obviously a critical first step in assuring the safety of our public water supply. As new links between human health and substances present in drinking water are established, new standards (including treatment techniques) are created to minimize the adverse effects of these substances. Both the U.S. Environmental Protection Agency (EPA) and the Massachusetts Department of Environmental Protection (MassDEP) maintain exacting standards. To protect public health in Massachusetts, we need to stay current and ensure that our state standards reflect current knowledge and federal rules for drinking water safety.

WE ARE CURRENT WITH ALL DRINKING WATER STANDARDS AND RULES



HOW ARE WE DOING?

MassDEP is current with adoption of all federal drinking water standards and is on schedule to adopt new standards. MassDEP has also taken the proactive step of establishing a first-in-the-nation standard for perchlorate to protect sensitive members of the population from this contaminant. During the next two years several new rules will be implemented and several will be finalized. In 2007 MassDEP will also make several minor regulation corrections previously adopted by EPA. Among those will be:

- Adoption of EPA's June 2004 list of minor corrections for 5 rules (in process).
- Stage 2 Disinfectants and Disinfection Byproducts Rule (federal promulgation occurred in January, 2006).
- Long Term 2 Enhanced Surface Water Treatment Rule (federal promulgation occurred in January, 2006).
- Groundwater Rule (EPA's proposed rule has yet to be finalized, estimated to occur in the Fall of 2006).
- Lead and Copper Rule Short Term Revisions (EPA's proposed revisions have yet to be finalized, estimated to occur in Fall 2006)

For detailed information on these rules as well as the number of systems that will be affected statewide please see workplan.

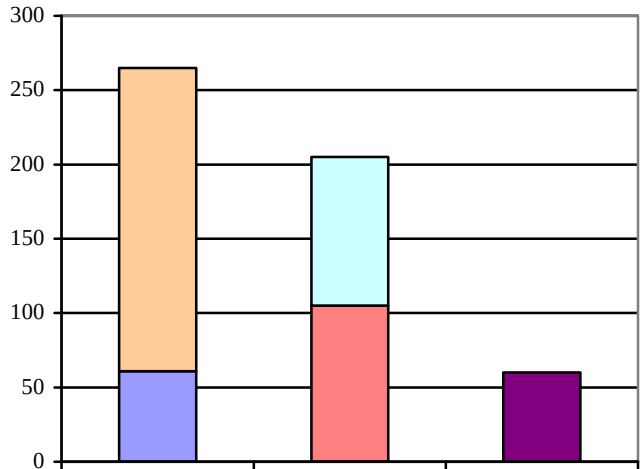
WATER THAT IS SAFE TO DRINK: SUPPORT PRIVATE WATER SUPPLY SAFETY

INDICATOR: NUMBER OF TOWNS WHERE PRIVATE WATER SUPPLIES ARE USED THAT HAVE ADEQUATE PRIVATE WELL REGULATIONS IN PLACE.

WHY IS THIS IMPORTANT?

State regulations apply only to public water supplies, which are defined as supplies that serve 25 or more people or 15 or more service connections for more than 60 days per year. However, we are still concerned about protecting the health of people who use private drinking water sources. These wells are regulated at the local level. Adequate local regulations are necessary for protecting the health of these people.

SOME PRIVATE WATER SUPPLIES USED FOR DRINKING WATER LACK ADEQUATE REGULATION



	Towns with private wells	Towns with bylaws	Towns still needing bylaws
No regulation			60
Some regulation		100	
Comprehensive regulation		105	
Private and public supply	204		
Entirely private supply	61		

HOW ARE WE DOING?

Over 550,000 people in Massachusetts currently depend upon private sources for drinking water. These people reside in 265 of the 351 towns and cities in Massachusetts. Because private sources are only regulated at the local level, protection of the health of private well users requires adequate local regulations. To support development of protective regulations and protection of health, MassDEP has developed model regulations and information on recommended sampling and safety measures. However, currently 60 of the towns with people using private sources of drinking water lack any local regulations covering these sources. Only 105 of the towns have comprehensive regulations addressing location, construction, water quality and quantity. We do not have current data on the extent of contamination present in private drinking water wells, though a 1988 study showed contamination of "at least 636 private wells in 120 Massachusetts municipalities"[1]. MassDEP programs to protect groundwater from contamination often also provide protective benefits to private wells but local governments have to take action to ensure the health of these private well users.

[1] Massachusetts Special Legislative Commission on Water Supply. April 1988, "Private Well Contamination in Massachusetts: Sources, Responses, and Needs.

CLEAN WATER: CONTROL POLLUTION FROM NONPOINT SOURCES

INDICATOR: UNDER DEVELOPMENT

WHY IS THIS IMPORTANT?

Indicator under development

Nonpoint source pollution or "polluted runoff" – which enters our water bodies from septic systems, agricultural uses and runoff from roads, parking lots, construction sites, lawns and other locations – is now the dominant cause of water quality problems to our lakes, rivers and coastal areas. Point sources still have significant impacts in certain water bodies, but across the state nonpoint source pollution affects more total miles and acres of water. Although these pollution sources are lumped under the single heading of nonpoint sources, in fact there are a huge variety of nonpoint sources from farms to parking lots, which result from a similarly wide range of activities, from cars with leaking oil to construction of new structures. This wide range of land-use activities and sources contributing to nonpoint source pollution, and our lack of data on total loading of pollutants from these many sources, make development of an indicator to measure our progress difficult, although control of nonpoint sources is clearly critical to improving the quality of our waters.

HOW ARE WE DOING?

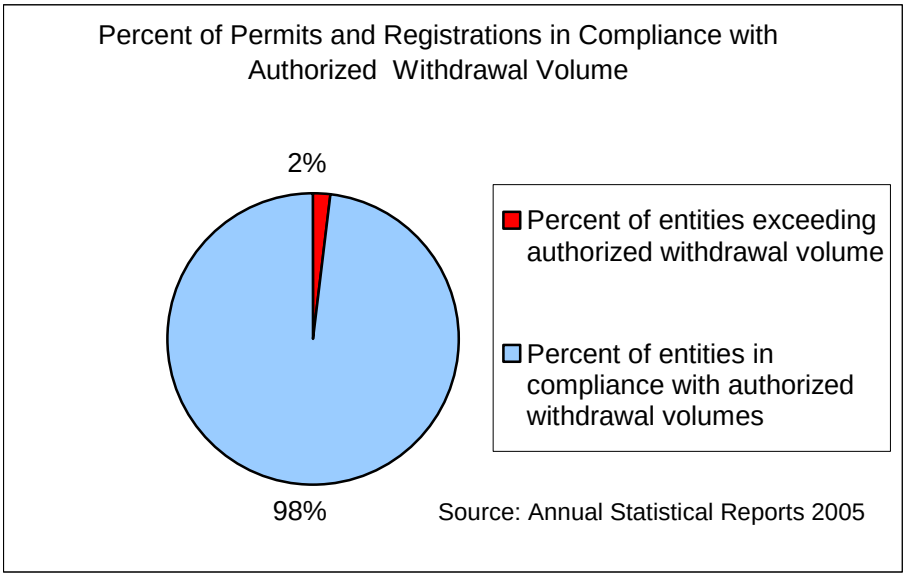
There are a number of on-going federal, state and local programs to reduce nonpoint source pollution, including new stormwater control requirements for many towns, reductions in illicit connections to our storm drains, and grants programs to implement practices to prevent and control polluted runoff and educate communities on the damage caused by the cumulative effects of many small sources of pollution. However, there are also disturbing negative trends, such as the dramatic increase in percent of impervious surface in the state, which increases stormwater runoff and pollution generally. Because we do not have comprehensive monitoring data for our state's water, particularly in headwater areas where the effects of nonpoint source pollution are likely to be greatest, and do not have meaningful water quality trends data, we cannot say with confidence how we are doing at controlling nonpoint sources of pollution. Our goal is to increase monitoring in headwater streams and to develop a statewide fixed site network in the next year to address these data gaps.

SUFFICIENT WATER FOR HEALTHY ECOSYSTEMS: Control Water Withdrawals – Compliance

INDICATOR:

- Percent of permits and registrations in compliance with authorized water withdrawal volume limits

THE COMPLIANCE RECORD IS GOOD



WHY IS THIS IMPORTANT?

This indicator measures how well the regulated community is maintaining compliance with authorized withdrawal volumes. Permitted and registered withdrawals are only one of the factors that contribute to flow problems in Massachusetts' rivers. However, controlling withdrawals through registrations and permits is one way that MASSDEP protects the environment while we work to assure adequate water for human needs. Limits on withdrawals in permits and registration are only effective to the extent that we assure compliance with those limits. This indicator measures how good compliance with these limits is in the state.

HOW ARE WE DOING?

The large majority of the regulated community with registrations and/or permits is in compliance with withdrawal volume limits. More difficult to determine is the number of entities that should, but do not, have WMA permits and are therefore not limited in amount or timing of their withdrawals. To address this, the Department is taking action to identify water withdrawals subject to the Water Management Act and requiring a permit that have not applied for appropriate authorization.

Additional data indicate that there is no relationship between compliance or number of permits and registrations in a basin and the degree of basin stress. However, if the majority of the regulated community is in compliance, yet there is increasing stress observed in basins, this might indicate a need to revisit our controls on withdrawals and other activities that affect water flows (such as infiltration and inflow, location and manner of sewage disposal, etc.). In order to assess the impact the WMA has on managing water use, the program needs to improve reporting and data management to support the WMA as an instrument to achieve these goals.

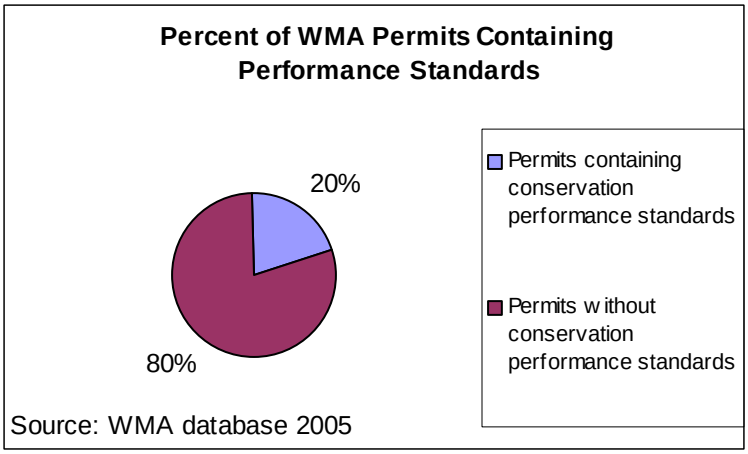
SUFFICIENT WATER FOR HEALTHY ECOSYSTEMS: CONTROL WATER WITHDRAWALS – PERMITTING

INDICATOR:

- Percent of permits containing conservation performance standards

WHY IS THIS IMPORTANT?

MORE PERMITS NEED PERFORMANCE STANDARDS



Stream flows are affected by many human activities, including wastewater disposal, leaking pipes, creation of impervious surface (that water cannot penetrate), dams and withdrawals. All of these factors are important and are addressed under a variety of programs within MASSDEP. The Water Management Act controls primarily withdrawals of water. While not the only factor that affects stream flows, proper control of withdrawals is a key component to protecting our rivers and streams and restoring flow impaired waters. Permitted withdrawals under the Water Management Act are approximately 15% of the total regulated volume of water withdrawn in the Commonwealth in an average year. Although permitted withdrawals are a limited part of the total problem, they are important and do provide a mechanism for not only holding the line against making any existing problems worse, but also starting toward significant improvements. This indicator measures how good a job MASSDEP is doing at controlling withdrawals through water management permits and requiring demand management practices to avoid wasting water, especially in basins that are already stressed.

This indicator measures those permits that include a performance standard requiring a PWS to meet residential gallons per capita day (RGPCD) limit of 65 and unaccounted – for-water (UAW) use of 10%. This performance standard currently appliers to all PWS in high and medium stress basins and water suppliers with Inter-Basin Transfer approvals issued by the Water Resources Commission.

HOW ARE WE DOING?

Currently, 20% of the permits issued for water withdrawal include the conservation performance standard for RGPCD and UAW. In addition to performance standards for UAW and RGPCD, permits in high and medium stress basins will also include conditions limiting non-essential outside water use and be required to evaluate the feasibility of mitigating any increase in authorized water use.

With the adoption of the new Water Management Permitting Policy in April 2004, we expect the number of permits containing performance standards and demand management controls to increase. The Policy describes the Department's work to review and condition permits relative to basin stress in order to protect aquatic habitat and ensure a stable water budget for all basins, especially those under high or medium stress. Implementation of this policy will dramatically increase the number of permits that have controls designed to prevent waste of our valuable water resources. In addition, all WMA permits are reviewed on a 5-year cycle. At the time of a permit's 5-Year Review, we will amend permits that have water sources located in high and medium stress basins to include higher level performance standards.

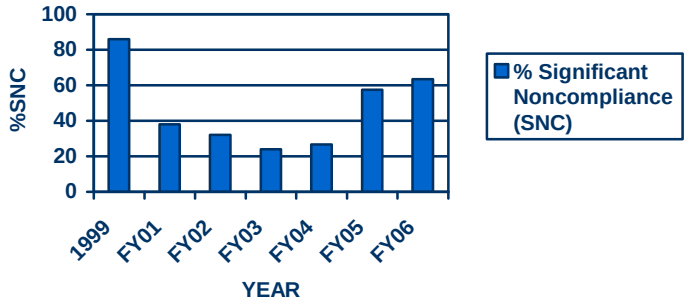
CLEAN WATER: CONTROL POLLUTION FROM POINT SOURCES-GROUNDWATER DISCHARGE PERMIT COMPLIANCE

INDICATOR: NUMBER/PERCENT OF DISCHARGES TO GROUND WATERS IN SIGNIFICANT NONCOMPLIANCE WITH PERMITS

WHY IS THIS IMPORTANT?

Permits designed to protect public health and the environment are only effective if the permittee complies with the limits imposed. Maintaining compliance with these permits helps assure that drinking water and surface waters are protected from pollution.

COMPLIANCE AT GROUNDWATER DISCHARGE FACILITIES IS IMPROVING



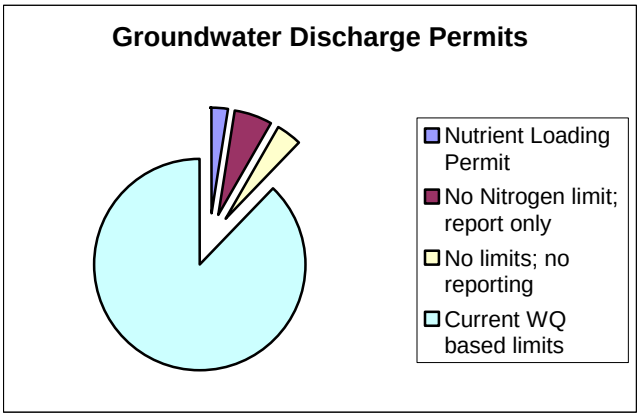
HOW ARE WE DOING?

In early 2000, an evaluation of the facilities regulated by the Groundwater Discharge Permit Program demonstrated that over 80% of the facilities were out of compliance with one or more program requirements. In response to this finding, the Department adopted a Comprehensive Compliance and Enforcement Strategy in Fiscal Year 2001. For the first 3 years of the strategy the significant noncompliance rate decreased to 23%. However, Fiscal Year 2004 showed a slight increase in this percentage and Fiscal Years 2005 & 2006 showed a greater increase in noncompliance with rates of 57.5% and 63.5% respectively. The reason for the increases is due to several factors, two of which are the transition of enforcement reviews and enforcement action issuance from Boston to the regional offices and the initiation of electronic reporting which allowed some leniency for missing DMRs. Cursory review shows that effluent violations and missing DMR violations are the largest contributors to the noncompliance rate. Boston will continue to work with the regional offices in the effort to improve compliance.

Control Pollution from Point Sources:
GROUNDWATER DISCHARGE PERMITTING

INDICATOR: NUMBER/PERCENT OF PERMITS WITH CURRENT WATER QUALITY BASED LIMITS

MOST GROUNDWATER DISCHARGE PERMITS HAVE CURRENT WATER QUALITY BASED LIMITS



WHY IS THIS IMPORTANT?

Discharges into groundwater have the potential to affect the quality of both drinking water and surface water. Permits for discharges into groundwater therefore must contain limits that protect groundwater quality. This indicator evaluates the number of groundwater discharge permits that have current water quality based effluent limits that protect groundwater.

HOW ARE WE DOING?

There are 252 permitted discharges to groundwater in the Commonwealth, of which 230 are for discharges of sanitary wastewater as shown on the chart. The remainder are for laundromats, carwashes and other non-sanitary discharges. For the sanitary discharges, 202 of these permits have limits that are protective of water quality. Of the 28 permits that do not have current water quality based limits, 7 are nutrient loading approach permits, 15 report nitrogen but have no limit, and 6 have no limits or monitoring requirements. Of course, even where permits are protective, they are only effective if the permittee complies with the limits, a measure that we also track. (See compliance with groundwater discharge permits). In addition, as we gain scientific knowledge about the contribution of groundwater to surface water quality we learn that permit limits we previously thought were protective may need to be revised. For example, the nutrient loading to many Massachusetts embayments and inland waters is approaching or has exceeded the limits of their ability to maintain ecological health. Based on the data collected to date, it appears that the primary cause of these eutrophication problems for marine waters is an overabundance of nitrogen and for inland waters is an overabundance of phosphorus discharged within the watersheds of these water bodies. Groundwater discharges are only one source of these pollutants, but we need to continually evaluate permit limits as our scientific knowledge advances.

Sufficient water for Healthy Ecosystems: Improve Streamflow

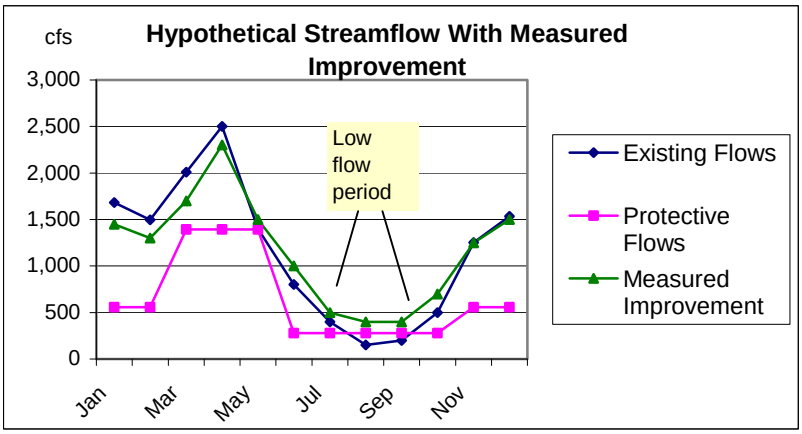
Indicators:

- Measured streamflow improvements from existing flows toward targeted protective flows in stressed basins.

WHY IS THIS IMPORTANT?

WE DO NOT YET HAVE DATA FOR THIS INDICATOR

When fully developed, this indicator will measure our progress in improving conditions in basins experiencing stress from impaired flows. The analysis will include information on what activities contribute to the water imbalance and point to potential remedies. A successful program will make progress restoring impaired flows at the same time that we make sure we are providing enough clean water for public health and safety and economic development. The graphic presented here is a hypothetical example of the kind of data, and measurement of progress, that we hope to have in the future.



HOW ARE WE DOING?

We do not currently have data to measure performance on this indicator. We are working toward, but don't yet have, protective flow targets to serve as a baseline against which we can measure our progress.

Improving stream conditions will require evaluating findings of cumulative impacts and rethinking where and to what extent we withdraw water, dispose of wastewater, manage stormwater, develop land, and conserve water in order to maintain protective stream flows while we provide water for human use. In this light, the Department is cooperating with a USGS investigative study to develop the Sustainable Yield Estimator Project. This project will provide a GIS-based screening tool for DEP to generate natural streamflow and (with water use and discharge data) present-day flow at ungaged sites for perennial streams in Massachusetts. This tool will help DEP evaluate cumulative impacts and consider varying protective stream thresholds to achieve a better balance between competing water uses.

Ultimately our goal is to improve those rivers and streams impacted by reduced flows as much as possible within the mandate of the Water Management Act (MGL 21G), which

establishes “a mechanism for managing ground and surface water in the commonwealth as a single hydrological system and ensuring, where necessary, a balance among competing water withdrawals and uses.”

The Department is working to conserve water with the implementation of the Water Management Policy For Permit And Permit Amendment Applications And 5-Year Reviews, Effective April 5, 2004 (WMA Policy #: BRP/DWM/DW/P04-1) This policy requires proposals for new or increased withdrawals in high and medium stressed basins to include an evaluation of water management strategies to offset proposed withdrawals by reducing out of basin flow or increasing water returned to the basin. (See Promote Wise Use of Water) We expect that the implementation of the policy will improve conditions by reducing overall water use in our stressed watersheds.

CLEAN WATER: KNOW CONDITION OF SURFACE AND GROUND WATERS

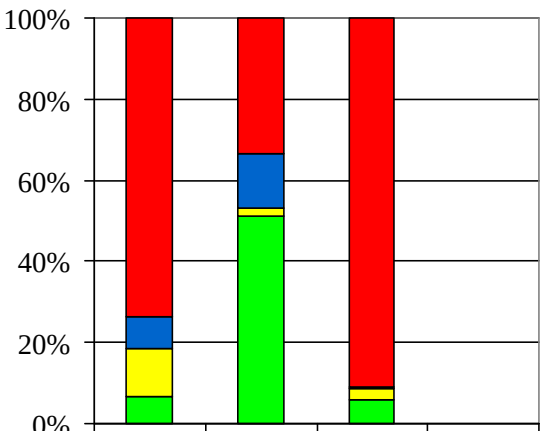
INDICATOR: PERCENT OF STATE'S WATERS ASSESSED AND WHERE CAUSE/SOURCE OF IMPAIRMENT IS KNOWN

WHY IS THIS IMPORTANT?

Monitoring the condition of our waters allows us to know where problems exist and, therefore, where we need to direct our attention. Sampling across the full spectrum of Massachusetts' waters helps us determine how widespread known problems are (e.g., nutrient pollution, mercury contamination) and also helps identify previously unknown problems. Sampling at the same locations over time tells us whether actions we take to address problems are working. Knowing that some waters are clean now helps us identify areas to preserve, so that we don't degrade existing high quality waters.

CONDITIONS AND SOURCES OF PROBLEMS NOT KNOWN FOR MOST WATERS

Percent waters assessed and source of impairment known



	Rivers	Lakes	Marine	
Not assessed	73.8	33.3	91	
Fully meeting assessed designated uses	7.6	13.6	0.4	
Impaired - source known	11.9	2.1	2.8	
Impaired -source not known	6.7	51	5.8	

HOW ARE WE DOING?

We only conduct monitoring and perform assessments at a small portion of Massachusetts' surface waters now. To make the best use of our limited monitoring capacity we focus on areas where we strongly suspect problems may exist, which is primarily in larger rivers.

Our surface water monitoring program now rotates through a five-year cycle, so we sample in roughly 20% of the state's watersheds each year. Left unsampled are tributaries and smaller rivers and most of the state's marine areas (including estuaries, coastal areas where fresh and salt water meet, and near coastal waters). During FY06 we have tried to expand our monitoring program to assess many of the smaller streams and to conduct more marine monitoring and source identification work. This level of monitoring, although increased, is still not sufficient to address all of the waters of the Commonwealth.

Although we hope that we have identified the most severe problems, such a limited monitoring program cannot determine the full extent of our pollution issues nor can it identify the subbasins where problems are most acute. Attempts have been made to

expand our information base by working with citizen volunteers and other entities interested in water quality and by finding other means to gather more information. Money spent to identify where problems occur and what is causing them will result in a more cost-effective way to fix those problems in the long run because scarce dollars can be applied to the most important problems, with confidence that we have identified an effective solution.

In 2004 we conducted a needs analysis and developed a "Water Quality Monitoring Strategy for the Commonwealth of Massachusetts". The Plan discussed and evaluated different types of monitoring needed to fill important information gaps and identified resource gaps and monitoring priorities. The Strategy will be used to help support the need for additional monitoring personnel. The goal is to address the gaps within 10 years. The strategy can be found at [http://mass.gov/dep/water/priorities/priorities.htm]

We do not currently have any comprehensive data on the condition of the state's groundwaters, although we do have data on a number of individual locations. Gathering this data to see what picture it presents of the state's groundwater quality is something we need to do as resources permit.

SUFFICIENT WATER FOR HEALTHY ECOSYSTEMS: Know Stream Flow Conditions

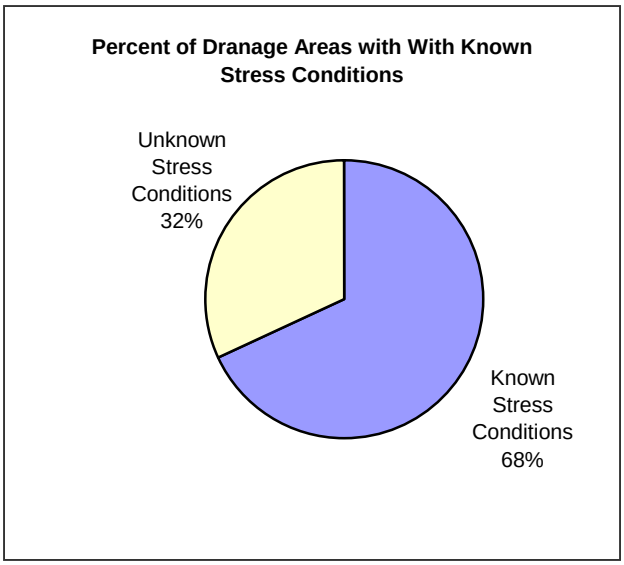
INDICATORS:

- PERCENT OF RIVERS FOR WHICH FLOW CONDITIONS ARE KNOWN

WHY IS THIS IMPORTANT?

Monitoring the flows in our waters allows us to know where flow problems exist and, therefore, where we need to direct our attention. Once we have protective flow targets or desired flow conditions established, these can be compared to data on actual flows to identify rivers where flow needs to be preserved and those that need to be improved.

FLOW CONDITIONS KNOWN IN MOST WATERSHEDS



HOW ARE WE DOING?

We have initial stress condition information on 68% of our drainage basin areas. This data represents the drainage areas within Massachusetts where we have a relative measure of stress on rivers and streams as defined by Water Resources Commission's Stress Basin Report. (WRC 2001). Data from 72 gages, mostly along main stems, was used by the WRC in the Stressed Basin Classification Report to designate hydrologic stress for river basins by comparing low flow statistics at gaged streams. The hydrologically stressed basins represent the rivers with the relatively lowest flows (per square mile of drainage area) in Massachusetts. The WRC Report indicates that approximately 5% or 407 square miles of drainage area is classified as “high stress” for stream flow conditions; 35% or 2898 square miles are under “medium stress”; 27% or 2207 square miles are under “low stress”; and 32% or 2580 square miles of drainage area are un-assessed for flow conditions.

Since we only have detailed flow data from gages on approximately 5% of the states named rivers, in the interim we are using the stressed basin classification as an indicator of stress conditions in streams located within a particular stress classified subbasin. There are many limitations to using this information to evaluate flow stress conditions. The first is that it only measures a watershed relatively close to its largest point; while that means it includes inputs from throughout the watershed, it also cannot tell us where smaller contributing streams are experiencing flow impacts. Second, it tells us what a river’s flow condition is relative to other rivers in the state, not how far or close it is to a healthy flow level.

In order to get a more accurate picture of stream flow conditions, the state needs to expand its network of stream gauges. [See Set Flow Standard.] This actual flow data can than be compared to a model hydrograph of optimal conditions to measure impacts and to identify where and at what times throughout the year mitigation is needed. These hydrographs, along with habitat assessments, can potentially indicate the degree to which flow regimes can be altered and still sustain a healthy ecosystem.

Currently, the United States Geological Survey (USGS) collects real-time flow data at 108 streams in Massachusetts. This flow data can be accessed at http://ma.water.usgs.gov/water/water_s.htm or http://waterdata.usgs.gov/ma/nwis/.

CLEAN WATER: PREVENT DEGRADATION

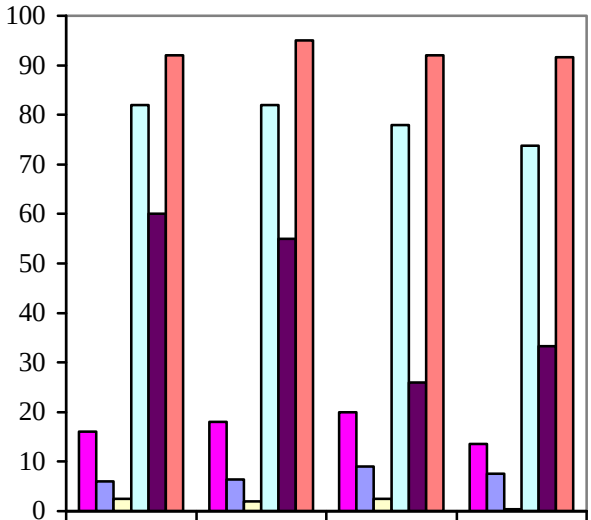
WE DO NOT HAVE ADEQUATE DATA TO PREDICT TRENDS IN WATER QUALITY STATEWIDE

INDICATOR: PERCENT OF RIVERS, LAKES, AND MARINE WATERS THAT FULLY SUPPORT ALL DESIGNATED USES.

WHY IS THIS IMPORTANT?

Massachusetts' lakes, rivers and coastal waters are valuable natural resources that provide habitat, recreation, fishing, and shellfishing. Our work to protect and improve water quality consists of two separate but related efforts: improving water quality where it is impaired and preventing good quality water from becoming impaired. It is easier and less costly to prevent problems from occurring than it is to fix them after they occur. For this reason, we need to maintain high quality waters. A good measure of our work to prevent degradation would be trends in the percent of waters that fully support all uses.

Percent of all waters fully meeting all designated uses and waters not assessed



	1998	2000	2002	2004
Lakes	16	18	20	13.6
Rivers	6	6.4	9	7.6
Marine	2.5	2	2.5	0.4
% of Rivers NOT Assessed	82	82	78	73.8
% of Lakes NOT Assessed	60	55	26	33.3
% of Marine Waters NOT	92	95	92	91.6

HOW ARE WE DOING?

Unfortunately, we do not know how we are doing at preventing water quality degradation because we have not been able to assess the majority of the waters of the state. For waters not assessed, we do not know what percent are supporting all designated uses, or if that percentage is increasing or decreasing. Waters that are known to fully support designated uses are listed here but there are two important limitations to this information: 1) There likely are many more good quality waters that are not included in this data because those waters have not been assessed, and 2) no trend inference can be drawn from the data because the sampling is done for assessment purposes and not for determining trends. Also different basins are sampled in different years; so increases or decreases in percent of high quality waters reflect differences in basins, not change over time in the same locations. Although we do not have data sufficient to assess our progress toward this goal, we do have many programs that are designed to prevent degradation of our surface waters including, but not limited to: discharge permitting, stormwater controls, the River's Protection Act, designation of "Outstanding Resource Waters" to protect high quality waters, and 5) the State Septic System

regulations (Title 5). In addition MASSDEP maintains compliance and enforcement programs and grant and loan programs such as the State Revolving Fund and Nonpoint Source (section 319) grants. These programs, in conjunction with the actions of the local boards of health, conservation commissions, lake and watershed associations, and others continue to prevent water quality degradation in the Commonwealth.

CLEAN WATER: RESTORE DEGRADED WATER QUALITY

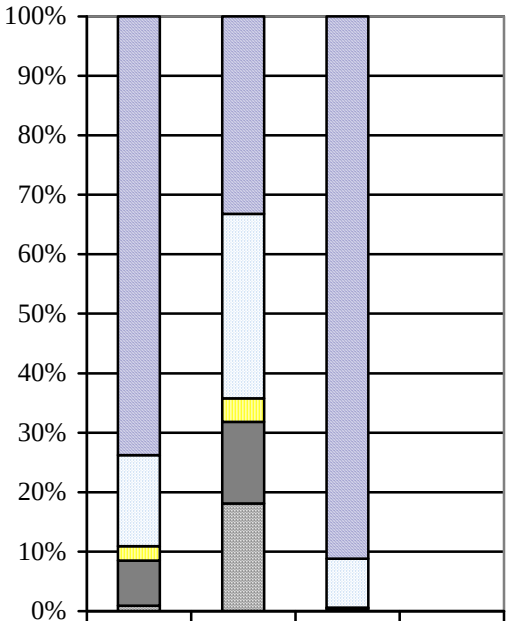
INDICATOR: PERCENT OF STATE'S IMPAIRED WATERS WHERE RESTORATION PLANS HAVE BEEN DEVELOPED OR ARE UNDERWAY

MANY MORE CLEAN UP PLANS NEEDED

WHY IS THIS IMPORTANT?

Measurably improved water quality is the target for our restoration work. However, because changes in water quality generally take some time, and because we do not have good trend data to use, for now we are using an intermediate measure as an indicator: the number of degraded waters for which we have done a clean up plan or a plan is underway. Implementation of those plans, and measurable results in the state's waters, is our long-term goal.

Percent Waters Impaired, Where Plans Have Been Developed, and Where Plans are Underway



	Rivers	Lakes	Marine
Not assessed	73.8	33.2	91.2
Impaired w/Study Underway	15.3	31	8.2
Impaired w/Study Completed	2.4	4	0.11
Fully Meeting Designated Uses	7.6	13.7	0.4
Impaired Study Not Yet Started	0.9	18.1	0.09

For many of the degraded waters in the state we know what is causing the problem, e.g., low dissolved oxygen or excess nutrients. However, we have significantly less information on the sources that contribute to the problem, e.g., whether the excess nutrients come from sewage treatment plants, septic systems, stormwater, agriculture, etc. Before we can take action to reduce sources, we need to know what sources contribute. A study that identifies the sources and sets out a plan for reducing them is a necessary first step for improving water quality in many areas of the state. The level of information needed to formulate a restoration plan can vary greatly depending upon the pollutant of concern and number of sources. In some cases the restoration actions are fairly straightforward and consistent for types of waterbodies. In those cases it is more important to develop and implement corrective actions than to spend a lot of time collecting more data. In other cases a significant amount of analysis (monitoring and modeling) are needed prior to plan development to quantify each source identify their relative contribution.

HOW ARE WE DOING?

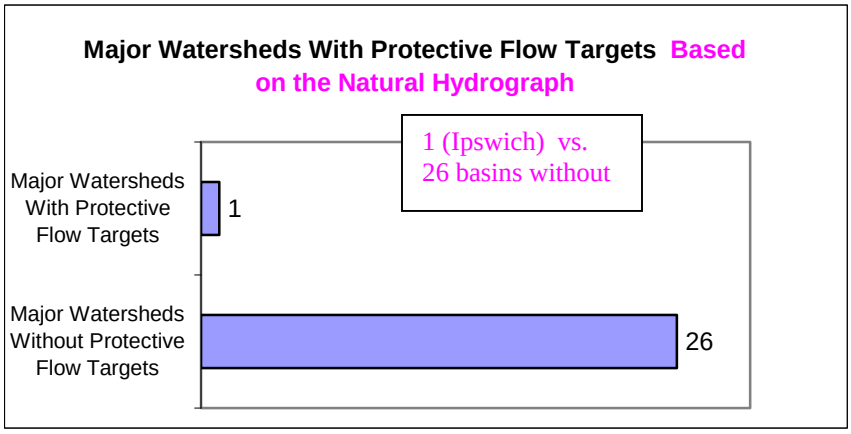
We have started developing restoration plans in a number of impaired waters throughout the Commonwealth although much more needs to be done. To date we have completed plans for 173 segments representing 199 water quality impairments and have a number of large studies underway including major efforts on Cape Cod through the Massachusetts Estuaries Project (MEP), the Nashua River, the Taunton River and the development of a statewide bacteria TMDL that may address hundreds of segments in all 27 watersheds in MA. Implementation is also underway to decrease the amount of mercury emissions that have resulted in about 100 waterbodies in MA that have been identified as containing elevated levels in fish tissue. These actions are occurring not only in MA but also throughout New England and a number of Canadian Provinces. We are attempting to improve efficiency in producing better environmental results by grouping problems with similar causes and trying to deal with multiple waters at the same time. Refer to work plan for more details. Since approximately 70% of the impaired waters in the state are impaired for either bacteria or nutrients, these issues are the primary priority for future plan development.

SUFFICIENT WATER FOR HEALTHY ECOSYSTEMS: SET PROTECTIVE FLOW TARGETS

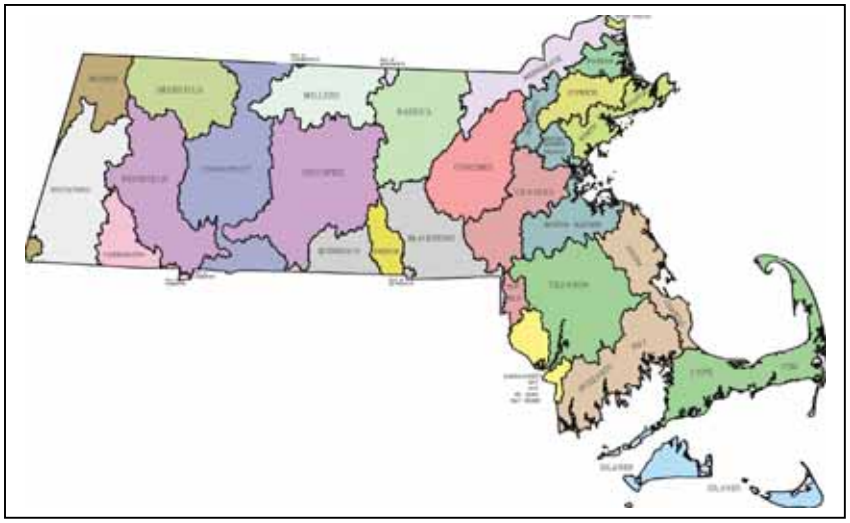
Indicator:

PERCENT OF MAJOR WATERSHEDS WITH PROTECTIVE STREAM FLOW TARGETS

PROTECTIVE STREAM FLOW TARGETS
(IN PROGRESS)



Map of Major Watersheds



WHY IS THIS IMPORTANT?
Before we can take action to assure that we have a healthy ecosystem, we need to know what flow levels and patterns are necessary to protect our river ecosystems and establish protective flow targets to improve river ecosystem health. Protective flow targets can help protect already stressed water resources and can prevent deterioration of conditions in basins that are not yet stressed. This indicator measures the number of watersheds in which the main river has an individually established stream flow target based on a desirable hydrograph that protects habitat. [Click here for sample hydrograph.]

How are we doing?

Currently, no watershed has a protective flow target based on the natural hydrograph and habitat requirements. The Department is working collaboratively with other agencies to identify a model hydrograph that will depict a river's hydrograph that is sufficient to protect aquatic health. Once that information is available we can compare desired condition to the current observed hydrograph and identify where flow problems exist and where corrective actions might be possible.

In order to protect aquatic habitats, the Department has established an interim streamflow threshold that triggers mandatory restrictions on non-essential outside water use. Restrictions will be required when stream flow falls below the US Fish and Wildlife's

New England Base Flow (ABF) default value of 0.5 cubic feet per second square mile (CFSM) for three consecutive days unless a site-specific study has established a more detailed flow statistic

Water suppliers can check real time data on stream flows at the nearest gauge at the USGS website at http://waterdata.usgs.gov/nwis/.

What specific efforts are there for development of flow targets?

There are two specific on-going efforts to address flow targets worth mentioning.

1. The Department is participating with the Department of Conservation and Recreation (DCR) in a statewide instream task force to address flow target goals for habitat protection. The WRC/DCR report currently in progress is expected to provide a range of flow statistics derived from USGS index gages. Along with hydrologic data, it is anticipated that the report will also introduce the initial set of biological markers to the natural hydrograph for consideration.

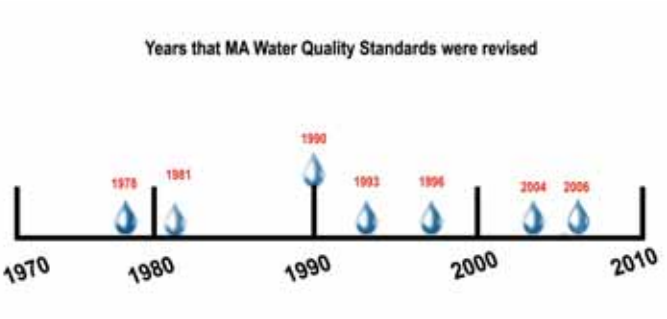
2. The Department is also collaborating with USGS in the development of the Sustainable Yield Estimator Project (SYE). The SYE is designed to provide MassDEP with a GIS-based screening tool to generate natural flow and present day flow at ungaged sites on any perennial stream. In addition to estimating cumulative flow impacts, the SYE will be an interactive tool enabling the Department to evaluate varying flow targets for consideration as we balance competing water interests.

CLEAN WATER: SET WATER QUALITY STANDARDS

INDICATOR: ARE WE CURRENT WITH WATER QUALITY STANDARDS?

WHY IS THIS IMPORTANT?

STANDARDS DELAYED, BUT STILL PROTECTIVE



Water quality standards define the quality that our waters have to meet to achieve the uses designated for each water body. All waters must have a goal of being of sufficient quality to be suitable for swimming and fishing. In addition to having swimming and fishing as designated uses, some waters are designated as drinking water and others as suitable for shell fishing. Having up to date standards helps us to ensure that our waters will be of sufficient quality do meet the designated uses and that our standards are protective of public health and aquatic habitat consistent with the latest science.

HOW ARE WE DOING?

EPA requires the states to review and update their Water Quality Standards (WQS) every three years. MASSDEP is not meeting this standard, and very few of the states in the country are. In FY06 MassDEP proposed new standards and received public comment on them. We are presently making final revisions based on public comment and hope to finalize them in FY07. Although we are behind in our issuance of updated water quality standards, protective standards are already in place and our most recent review did not lead to any major changes in the standards. So although we did not meet the administrative requirement, we do not believe that the delay compromised water quality. However, the public process to review our water quality standards also provides a forum for public input into our standard setting process. Even when no significant changes result, the interaction with members of the public improves communication between MASSDEP and the public and obtaining public input is a key reason for reviewing the regulations on a regular basis.

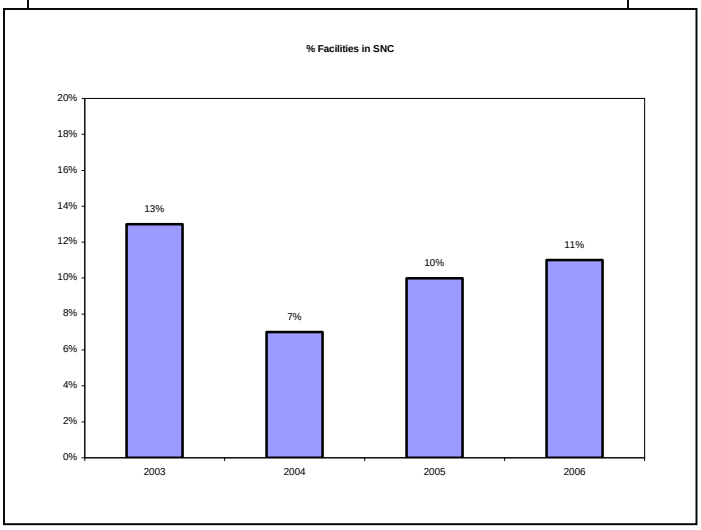
CLEAN WATER: CONTROL POLLUTION FROM POINT SOURCES-SURFACE WATER DISCHARGE COMPLIANCE

INDICATORS: NUMBER/PERCENT OF DISCHARGES TO SURFACE WATERS IN SIGNIFICANT NONCOMPLIANCE WITH POINT SOURCE PERMITS

WHY IS THIS IMPORTANT?

Compliance with technology and water quality based permit limits is essential to insure that point source pollutant loadings do not impair the designated uses of the receiving water and achieve the goals of the surface water quality standards. We monitor compliance with those limits to ensure that the intended protection is achieved. This indicator evaluates the number of surface water discharge facilities that are in significant violation of their permit limits, as a measure of how well we are doing obtaining compliance with the permits designed to protect surface water quality.

SIGNIFICANT NONCOMPLIANCE (SNC) AT SURFACE WATER DISCHARGE FACILITIES IS IMPROVING



HOW ARE WE DOING?

In 2006 there were 32 NPDES facilities out of 289 in Significant Noncompliance with their permits compared to 29 of 292 in 2005, 23 of 324 in 2004 and 41 of 314 in 2003. Nineteen of these facilities violated monthly average effluent limits and 13 violated other requirements such as non-monthly limits, report filings, compliance schedules and DMR data omissions. Enforcement orders with compliance schedules have been issued or are pending for all 19. The effluent parameters most frequently triggering SNC at the 19 facilities were: biochemical oxygen demand (BOD), total suspended solids (TSS), copper (Cu), aluminum (Al), and total phosphorus (TP). A more detailed accounting of the specific violations is provided in the Surface Water Discharge Compliance Work Plan. Copper is the most frequently violated parameter, because many current NPDES permits have very stringent compliance limits for copper based on EPA national criteria that are difficult for most facilities to achieve, in many cases lower than is necessary to protect water quality. MASSDEP is in the final stage of promulgating revisions to the state surface water quality standards, which include statewide site-specific copper criteria. The result will be more accurate toxicity limits for copper that will continue to protect water quality without requiring unwarranted levels of investment by regulated entities in an attempt to achieve the limits. New site-specific limits will significantly reduce the level of noncompliance while still protecting water quality. More troubling are the numbers of TSS and BOD violations associated with POTWs receiving more wastewater, as a result of excessive infiltration and inflow (I/I), than can be effectively

managed. Discharge monitoring data from many POTWs indicate that mass loading limits for conventional pollutants such as BOD and TSS or percent removal criteria are being violated during wet weather events. Plans to address these violations are set forth in the work plan.

CONTROL POLLUTION FROM POINT SOURCES: SURFACE WATER DISCHARGE PERMITTING

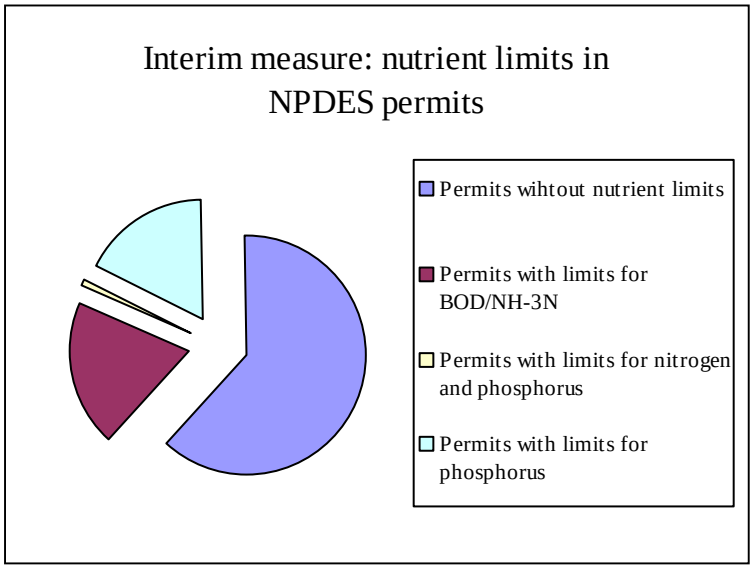
Indicators:

- NUMBER OF DISCHARGES CONTRIBUTING TO WATER IMPAIRED FOR NUTRIENTS
- NUMBER OF CSO AND STROMWATER DISCHARGES TO WATER IMPAIRED FOR BACTERIA

Why is this important?

Permits may not be sufficiently protective

Point sources are significant contributors to the pollution load in surface waters. At controlled levels, these pollutants can be discharged without harming our waters or the plants and animals that live there. The Surface Water Discharge Program helps to assure that our surface waters meet water quality standards and uses established by the Clean Water Act by controlling pollution from point sources. The effluent limits contained in surface water discharge permits are set to ensure such protection.



The two most significant causes of impaired water in Massachusetts are nutrients and pathogens. Therefore we need to measure whether we have adequately controlled surface water discharges by looking at the extent to which we control nutrient and bacteria inputs to surface water bodies. When fully developed, this indicator will evaluate the number of surface water discharge permits that are contributing to surface water bodies with identified impairments due to nutrients or bacteria. At the present time we do not have the data bases linked to geographic information systems to comprehensively determine which permits allow discharges to such impaired water bodies. As an interim measure we are tracking whether our permits contain limits for nutrients and bacteria.

HOW ARE WE DOING?

The 2004 Integrated List of Waters for Massachusetts identifies 1097 surface water body segments as impaired of which 302 and 209 are river segments and estuaries, respectively. Nutrients and pathogens are the most prevalent causes of impairment. A preliminary analysis of the data indicates that at least 158 of NPDES/BRP permits authorize discharges to waters known to be impaired. This suggests the need to investigate further but does not by itself demonstrate that those permits are causing the water quality problem; many other factors contribute to water quality impairment,

including nonpoint sources and physical alterations. All BRP permits contain bacteria limits. With respect to nutrients, only 72 of the 158 permits include limits, which are known to be a significant cause of water quality problems in many waterbodies. As is true of discharges to impaired waters, this alone does not demonstrate that the permit is not protective; the discharge may not contain excessive amounts of nutrients and/or the water body to which it discharges may not have nutrient problems. Further investigation is needed to determine which permits require tighter limits.

Combined Sewer Overflows (CSOs) occur in several watersheds across the Commonwealth. The discharge of untreated sewage associated with CSO events causes periodic (storm related) non-compliance with surface water quality standards for bacteria. Twenty-six communities have CSO systems, which impact Boston Harbor, Merrimack River, Nashua River, Connecticut River, Mount Hope Bay and New Bedford Harbor. All CSO discharges are covered under NPDES permits which require the implementation of "9 minimum controls" to reduce CSO impacts and the development of "Long Term Control Plans" (LTCPs). The elimination and/or treatment of CSO discharges over the past 20 years has significantly decreased the number of CSO events and volumes discharged by approximately 50%. The implementation of the "LTCPs" will produce additional reductions over the next 10-20 years, which cumulatively will reduce CSO volumes by over 75%.

Storm water discharges to surface waters cause water use impairments in water bodies across the state. The development of better storm water controls through the NPDES Storm Water Phase 2 program will lessen the impact to surface waters through better controls implemented at the local level. Quantification of water quality impacts from storm water and anticipated reductions through remediation are difficult to project so implementation aimed at lessening impacts to water quality is geared towards the development and implementation of "Best Management Plans" [BMPs] which can be assessed qualitatively as to their effectiveness over time.

PROTECT INTACT FUNCTIONING WETLANDS: DETERMINE EXTENT OF WETLAND LOSS

Indicator: Percent of state for which we have data on wetland loss

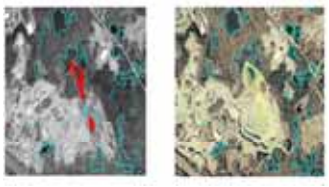
WHY IS THIS IMPORTANT?

DEP'S INNOVATIVE WETLAND LOSS MAPPING IS SUCCESSFUL IN DETERMINING EXTENT OF WETLAND LOSS

Our main interest in protecting wetlands is to preserve the many functions that wetlands provide, including flood control, contaminant filtering, groundwater recharge and wildlife habitat. While many things can impair wetland functions, they lose all functions when they are filled. Determining the extent of wetland loss is therefore a critical first step in determining how our well our wetlands are functioning and what more we need to do to protect them.

HOW ARE WE DOING?

Using an innovative GIS based computer program and wetlands mapping data compiled over the past fifteen years, MassDEP's Wetlands Resource Mapping Project has accurately located and mapped wetlands. By comparing changes over time, these wetland maps can also depict those wetlands that have been filled. Through this effort, MassDEP is developing reliable and verifiable data on freshwater wetland loss. Analysis of the 2001 imagery determined that over 850 acres of wetlands within the study area (which covered 70% of the state) were filled between 1990 and 2001 (the span of years varies by area of the state; we do not have statewide map coverage for the same years). While this loss is a relatively small portion of the total wetlands in the state, it is far more than we would like, particularly in areas that already have significant historical wetlands losses.



Updates of the analysis of loss are continuing. New flights and photography were conducted in April of 2005 to identify wetland loss that occurred between 2001 and 2005. Imagery is being analyzed during the summer and fall of 2006. Preliminary image analysis of the 2005 information has found 725 sites where wetland loss occurred for a total of 214 acres within an area comprising approximately 80% of the Northeast and Southeast Regions. Further analysis including the first round aerial photo change analysis for the 30% of the state lacking previous flyover data is underway. Our goal is to obtain new data about every 2-3 years so we can keep a current tally on wetlands loss in the state.

PROTECT INTACT FUNCTIONING WETLANDS: IDENTIFY THE CAUSES OF WETLAND LOSS

INDICATOR: PRINCIPAL CAUSES OF WETLAND LOSS IDENTIFIED

WHY IS THIS IMPORTANT?

ILLEGAL FILL A SIGNIFICANT PROBLEM

Knowing the principal causes of wetland loss will allow the Department to take action to reduce filling of wetlands by directing our efforts where they are likely to be the most effective. If the majority of wetland loss is from illegal activity, for example, then changes to regulations are not likely to effectively reduce losses. Strategies to reduce losses from agriculture, because of agricultural exemptions and the operational practices in agriculture, among other issues, are also likely to be different from strategies to reduce acres filled by commercial developers.

HOW ARE WE DOING?

We have analyzed the data we have collected to determine what the principal causes are and how we can most effectively intervene to better protect wetlands. The most significant finding to date, which has already changed DEP's focus, is that a very large portion of the identified fill was unpermitted. This discovery has resulted in a shift toward compliance and enforcement strategies in our work.

We have also examined the areas of loss to see what types of activities account for the most change. In 2004, agriculture, residential, and commercial activities account for the largest portions of losses identified. Since 2004, we have obtained updated aerial imagery and have preliminary information on the updated causes of wetland loss. While agriculture, commercial and residential development represented about 74% of the wetland loss in 2004, in 2006 they represent only 44% of the loss. The 2005 aerial imagery shows that while commercial and residential development continue to be a large cause of wetland loss at a combined 36%, the loss from agricultural and cranberry bog activities has dropped significantly to approximately 8%. These numbers only represent the loss in 80% of the NERO and SERO and do not include CERO or WERO. The analysis is ongoing and is anticipated to be complete in December 2006. Assessing the factors that have contributed to the identified losses will enable DEP to reduce losses in the future.

Agriculture has dropped from 32% to 8% of wetland loss

In the future, we plan to continue reviewing wetland loss data for all towns, update and automate our permit tracking system and electronically link it to the wetland loss maps so that data is more accessible and those fills that are permitted can be distinguished from those that are illegal [see Improve Wetland Database Integration Summary]. We will

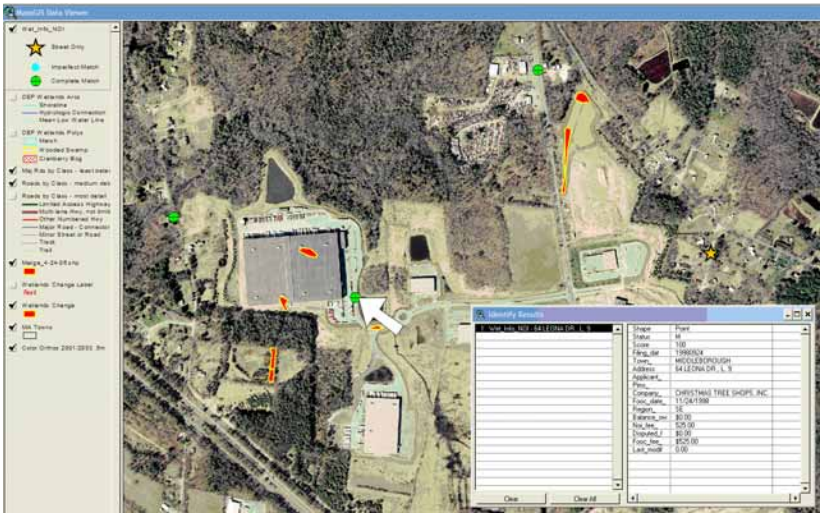
update our data regularly with new overflights because wetland loss patterns and causes may change in the future. The latest statewide aerial photography was obtained in the Spring of 2005. Regular updates are scheduled to occur every 3-5 years.

PROTECT INTACT FUNCTIONING WETLANDS: IMPROVE WETLAND DATABASE INTEGRATION

INDICATOR: % WETLAND PERMITTING AND ENFORCEMENT DATA FROM WETLAND LOSS MAPS

WHY IS THIS IMPORTANT?

Despite the successes of the Wetlands Change Project as a pilot initiative, the DEP currently faces several challenges in integrating it with the existing permitting and enforcement data and capturing new data so that wetland staff can instantly determine whether a loss site is permitted or has/had an enforcement action on it. This will improve our ability to determine the cause of wetland loss, as well as our ability to determine what action to take. Prompt action is more likely to result in successful wetland restoration where wetlands were illegally filled, or successful wetland replication when constructed areas fail or are never built. Ultimately, improving our wetland loss data can accomplish an overall reduction in wetland loss by deterring illegal filling, encouraging review of permitted activities and by developing compliance strategies.



VISUAL INTEGRATION OF WETINFO AND WETLAND LOSS INFORMATION

HOW ARE WE DOING?

In the spring of 2005, the DEP was the recipient of a three year Wetland Demonstration Program Grant in the amount of $600,000 from the U.S. Environmental Protection Agency (EPA). Most of the monies from this grant will go towards achieving the goals of this project (i.e., to integrate wetland databases and visually present data compilations of the Wetlands Program so that we can link permitted projects with GIS identified wetland losses and determine which are permitted and which are illegal). Existing databases include data from ongoing wetland permitting (WETINFO), eDEP (electronic filing database), enforcement (MADOG currently under development), and the aerial wetlands loss mapping. When complete, this system will also allow the DEP to track and

distinguish permitted vs. illegal fill, how much and what type of loss was permitted; and which sites have had enforcement action (or investigation). We will also develop a system to identify and track wetland replication areas associated with permitted projects, restoration areas associated with enforcement actions, and other stand-alone restoration projects to track wetlands gained. In the Fall of 2005, MassDEP initiated the process to hire a consultant to conduct a needs assessment to define the scope of work to meet our goals. In January, the consulting firm SAIC (Science Applications International Corporation) was hired and a data needs analysis was completed in August 2006. A second contract will be advertised in the Fall of 2006 to implement the recommendations of the needs assessment, with the first phase final product due in 2008.

INTACT FUNCTIONING WETLANDS: *PROTECT WETLAND FUNCTIONS*

INDICATOR: PERCENT OF STATE MAPPED FOR HABITAT OF POTENTIAL REGIONAL AND STATEWIDE IMPORTANCE

WHY IS THIS IMPORTANT?

We protect wetlands to protect the important functions they provide to us – public and private water supply & groundwater; storm damage prevention and flood control, prevention of pollution, and providing food, shelter, overwintering and nesting/spawning habitat for fisheries, shellfish, and wildlife habitat. Destruction of wetlands also destroys the functions those wetlands serve. But wetlands can also be harmed in many other ways. Fragmentation of wetland can interfere with the wildlife habitat functions of that wetland far more than the few square feet of fill involved would suggest. And wetland functions can be compromised by actions beyond the wetlands themselves – for example, cutting off access to uplands impedes movement through wildlife corridors. We currently do not have a good overall means to measure changes in wetlands function, but suspect that the acres of wetlands whose functions have been impaired far exceeds the amount of wetlands directly filled.

HOW ARE WE DOING?



Progress is beginning to be made on the first part of functional assessment. MassDEP is supporting the development of work conducted by UMASS Amherst to develop the Comprehensive Assessment and Prioritization System (CAPS). In March 2006, MassDEP issued the Massachusetts Wildlife Habitat Protection Guidelines for Inland Resource Areas (see http://www.mass.gov/dep/water/laws/wldhab.pdf). During the development of the guidance, we adopted the Conservation Assessment and Prioritization System (CAPS) as the approach to mapping wildlife habitat of potential regional or statewide importance. The CAPS is an objective, dynamic, and flexible tool and approach for assessing the ecological integrity of lands and waters and subsequently identifying and prioritizing land for habitat conservation.

In addition, USEPA is requiring states to undertake assessments of the ecological health of wetlands. MassDEP is considering how to meet this requirement and is examining the use of a wetlands health assessment methodology developed by Massachusetts Coastal Zone Management under a 104(b)(3) grant.

Significant time and effort are being invested by MassDEP and others in the development and siting of the Taunton River Watershed Wetlands Mitigation Bank authorized by the Transportation Bond Bill of 2004 (Section 89 of Massachusetts Acts Chapter 291). The purpose of the bank, in addition to offering mitigation opportunities for projects

impacting wetlands, is to determine if mitigation efforts can be improved by establishing large area mitigation banks with significant oversight during the planning, construction and post-construction monitoring phases. If successful, the replication of wetland functions that are currently lost to projects and illegal fill may be improved through this effort. MassDEP also commented on the recent Federal Mitigation Rule which seeks to improve mitigation efforts under the Clean Water Act.

PROTECT INTACT FUNCTIONING WETLANDS: REDUCE PERMITTED WETLAND LOSSES

INDICATOR: TOTAL PERMITTED WETLAND LOSS

WHY IS THIS IMPORTANT?

Recent studies show that illegal fill is likely the largest single cause of direct wetlands loss. However, some wetlands fill is permitted by local conservation commissions and by the state because some activities are exempt from the wetlands rules (e.g. land in agricultural use and utility maintenance and repair), some activities may exceed the limit of fill allowed (e.g. "limited projects" such as roadway improvements and agriculture), and the rules allow up to 5000 s.f. of wetlands alteration when it cannot be avoided. However, in most cases the effects must be minimized, and the acreage and functions of the wetlands replaced. Wetland creation is difficult and expensive, and studies show that attempts to replace lost wetlands functions are often unsuccessful. Therefore, we try to minimize losses, and also work to improve the success of created wetlands where the loss is unavoidable. MassDEP amended its wetland protection regulations in 2005 to strengthen and clarify the requirement for applicants seeking to fill wetlands as part of a project proposal to first demonstrate that they have avoided and minimized the proposed fill to the maximum extent feasible.

HOW ARE WE DOING?

We do not have good data on the extent of permitted wetlands losses, because much of the permitting in the state occurs at the local level, and the extent of permitted wetlands alterations is not always provided to DEP. The records that we do have at the state level are primarily paper records and so the data is not easily compiled for the over 8,500 permitting decisions made each year. In our review of 92 towns completed in 2004, we found that about 15% of the acres filled were likely permitted (i.e. about 95 acres). Based on the data we concluded that there was a need for realignment of program functions to reduce the amount of time spent on permitting tasks in order to undertake or increase tasks oriented towards identifying, addressing and avoiding illegal wetlands loss through compliance and enforcement. As such, the annual Wetland Program staff time allocation for permit review has shifted from 50.5% in FY2003 to 42.8% in FY2006. Correspondingly, staff time dedicated to both compliance and enforcement has increased from a combined 12.5% in FY2003 to 21.5% in FY2006. As a complement to increased enforcement, program staff resources have also increased compliance efforts from 3.9% in 2003 to 6.8% in 2006. While the amount of unpermitted fill appears to greatly exceed the amount permitted, we also need to make sure that permitted fill is minimized, and that wetlands required to be created successfully reproduce the lost wetlands acreage and functions.

To reduce time spent on permitting tasks while maintaining environmental protection, we made several regulatory and policy changes including new simplified review for projects in the buffer zone and increased affirmations of conservation commission decisions. To track permitted wetland loss and wetland creation where impacts are unavoidable, we

began an effort in 2005 under an EPA grant to link electronic applications with our wetland loss maps to determine which alterations are permitted and whether replication areas have been successful. Our progress and schedule is shown in the table below. We also plan to use this data to work together with Conservation Commissions to tighten monitoring requirements in permits, and to dramatically increase inspections during construction, post-construction, and prior to issuance of a Certificate of Compliance. We expect that this work will greatly minimize permitted loss of wetlands.

Year Completed or Scheduled	**Task**	**Key Data**
2004	Wetland Loss Analysis Complete	850 acres lost (70% of state analyzed)
2004 (2001-02 research)	92-Town Survey Complete	15% wetland loss permitted
2005	New aerial photos obtained	
December 2006	Wetland Loss Analysis Updated Pursuit of Enforcement and restoration	Updated number acres lost (As of August 2006, 80% of NERO and SERO shows 214 acres of wetland loss)
2008	Phase I Data Integration Project Complete	Updated % permitted vs. unpermitted

PROTECT INTACT FUNCTIONING WETLANDS: *REDUCE UNPERMITTED WETLAND LOSSES*

INDICATOR: ACRES LOST THROUGH UNPERMITTED ACTIVITY

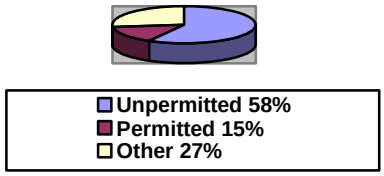
WHY IS THIS IMPORTANT?

DEP REALIGNING PROGRAM TO REDUCE ILLEGAL WETLAND LOSS

The two principal ways MassDEP can protect wetlands are preventing unpermitted losses and carefully controlling permitted losses. Preventing unpermitted losses is particularly important because unpermitted activity – which by definition escapes all review -- can occur in locations and in ways that are particularly damaging to the environment. Unaddressed unpermitted activity can also erode respect for compliance in other segments of the regulated community, as responsible citizens observe other people "getting away with" violations. And we are all too aware that restoring filled wetlands is often very expensive and sometime not possible. Prevention of unpermitted activity is therefore a high priority.

HOW ARE WE DOING?

2004 Permitted vs. Unpermitted Wetland Loss



In 2004 we completed our first wetland loss analysis based on 2001 aerial imagery. In addition, we conducted a study to obtain further information on the permitting status of wetland loss in a sample of 92 towns in Massachusetts. From this study, we estimated that about 58% of the identified historic losses were the result of unpermitted or possibly unpermitted activity[2]. This is considerably more unpermitted loss than we expected to find, given Massachusetts's history of strong wetlands protection. To address this problem, between December 2003 and June of 2005 the Department increased enforcement efforts and ordered restoration of 35 acres of wetland and assessed $1.9 million in fines through 83 separate higher level enforcement actions. Between July 2005 and June 2006, the Department ordered restoration or replication of 8.7 acres of wetlands and 1,880 linear feet of bank and streambeds and issued penalties of $746,000 (including 12 cases identified through aerial photography, requiring restoration of 5.62 acres and assessing $295,500 in penalties). MassDEP has historically expended less than 10% of its staff time on enforcement and prevention of illegal fill. As a result, we concluded that there was a need for realignment of program functions to reduce the amount of time spent on permitting tasks and increase the time spent on avoiding illegal wetlands loss through compliance and enforcement. One strategy for reducing time spent on permitting functions has been to issue more affirmations of Conservation Commission decisions. We anticipate that this strategy will reduce permitting time and appeals.

[2] While the sample of towns was not selected randomly and we cannot confidently extrapolate this data to the entire state, we believe the percentage of likely unpermitted activity found in the sample is likely representative of statewide conditions.

MassDEP achieved a statewide average 42% affirmation rate during state fiscal year 2006 (FY06 - July 1, 2005 – June 30, 2006). Other efforts to reduce illegal wetland loss include: enlisting help from Conservation Commissions by providing CD-ROMs to 243 towns where mapping had been completed and analyzed and significant technical assistance by the Circuit Rider Program to ultimately help reduce time spent on permitting. We are currently evaluating whether or not we have been successful at reducing time spent on permitting and increasing time spent on compliance and enforcement.

We have conducted a new overflight of the state in April 2005 to measure the extent of unpermitted fill at that time, as a first measure of our effectiveness in reducing the destruction of wetlands. We expect that analysis to be done by December of 2006. With renewed efforts to integrate assorted wetland databases, combined with the introduction of electronic applications, we will be developing a link between permits issued and wetland losses identified on our maps. We expect that this will increase our ability to quickly distinguish those fills that are unpermitted from those that are permitted [see Improve Wetland Database Integration Summary].